Meeting Summary
San Antonio River TMDL Stakeholder Group

February 24, 2005

STAKEHOLDERS PRESENT: Ken Diehl, Gregg Eckhardt, Mike Gonzales, and Steve Graham.

OTHERS PRESENT WHO REQUESTED TO BECOME STAKEHOLDERS:
Aaron Wendt (TSSWCB), Steve Lusk (SARA), and Rebecca Reeves (SARA).

STAKEHOLDERS ABSENT: Fernando Rios, Chad Smith, Sue Calberg, Vi Malone, Mark Beaman, Nancy Beward, Jerry Allen, F.C. Balser, Lupe Castro, Israel Hernandez, Randy Jurgajtis, Gary Meyer, Rusty Snyder, Mary Francis Szalwinski, and Connie.

SUPPORT TEAM PRESENT: Kerry Niemann (TCEQ), James Miertschin (James Miertschin & Associates), and Timery DeBoer (Hicks & Company).

WELCOME AND INTRODUCTIONS:
Kerry Niemann (KN) opened the meeting at approximately 11:45 AM and introduced himself, James Miertschin (JM), and Timery DeBoer. Mr. Niemann requested that those present fill out a questionnaire provided by TCEQ that requested feedback on the TMDL process. Mr. Niemann also mentioned that all previous meeting summaries and other project-specific information can be accessed via the TCEQ website.

PRESENTATION SUMMARY:
James Miertschin gave the presentation. [*NOTE: Questions (Q), Answers (A), and Comments (C) are inserted in italics for clarification.*]

Mr. Miertschin stated that the purpose of the meeting included: (1) reviewing background information, (2) reviewing monitoring results, (3) updating stakeholders on preliminary modeling results, and (4) discussing the next phase of the TMDL.

Due to elevated bacteria indicators, specifically fecal coliform and E. coli, Segments 1901 and 1911 of the San Antonio River and Segment 1910 of Salado Creek were selected by TCEQ for assessment in an area known as Project Area 2- Basin Groups D and E.

A Total Maximum Daily Load (TMDL) establishes the maximum amount of an impairing substance that a water body can assimilate and still meet water quality standards. This amount, or load, is then allocated among pollutant contributors. The specific criteria established by the Environmental Protection Agency (EPA) are 126 colonies per 100 mL (geometric mean) and 394 colonies per 100 mL (single grab).

TMDL development includes the following steps:

- Segment listed on the federal Clean Water Act Section 303(d) list of impaired waters.
- Pollutant is identified (bacteria)
- TMDL project initiated
- Data collection
- Data assessment
- TMDL allocation- identification of a quantifiable water quality target for each constituent
- Develop a TMDL Implementation Plan
- Draft TMDL Report
- TCEQ review / Public comment
- TCEQ approval / EPA approval

Stakeholder involvement is very important to the TMDL development process.

E. coli is a type of bacteria that lives in the intestines of mammals. It can enter the water from either Point Sources (i.e. pipe, ditch, channel, tunnel, conduit, well, landfill, concentrated animal feeding operation, etc.) or Non-Point Sources (i.e. rainfall washing manure, oil, grease, litter, fertilizer, etc. into storm drains, creeks, and rivers). Suspect pollutant sources for bacteria include wastewater treatment plants (WWTPs), confined animal feedlot operations (CAFOs), on-site sewage facilities (OSSFs), domestic animal feces, wild animal feces, stormwater runoff, and agricultural practices.

Background

Salado Creek: Historical data was reviewed from 1996-2001 and new data was collected for this project beginning in 2002. Historic data indicated that 9 of 16 stations exceeded the E. coli criteria and 12 of the 16 stations exceeded the fecal coliform criteria. Therefore, TCEQ initiated the TMDL.
Q: Do you have a data layer available for the locations of sewer mains? One is available.
A: No, we would appreciate having that information.

Upper San Antonio River (USAR): Historical data was reviewed from 1996-2001 and new data was collected for this project beginning in 2002. Historic data indicated that 1 of 9 stations exceeded the E. coli criteria and 9 of the 9 stations exceeded the fecal coliform criteria. Therefore, TCEQ initiated the TMDL.

Lower San Antonio River (LSAR): Historical data was reviewed from 1996-2001 and new data was collected for this project beginning in 2003. Historic data indicated that 3 of 5 stations exceeded the E. coli criteria and 3 of the 5 stations exceeded the fecal coliform criteria. Therefore, TCEQ initiated the TMDL.

Q: Is there a reliable ratio between E. coli and fecal coliform?
A: Yes, based on our data it is 1/0.9
Q: It's from non-human sources?

A: Not necessarily. It means that it came from the intestines of warm-blooded animal.

Monitoring Results

Salado Creek: Routine, baseflow, and runoff sampling was conducted at 8 mainstem stations, 4 tributary stations, and 1 point source.

USAR: Routine, baseflow, and runoff sampling was conducted at 11 mainstem stations, 3 tributary stations, and 6 point sources.

LSAR: Baseflow and runoff sampling was conducted at 9 mainstem stations, 2 tributary stations, and 6 point sources.

Bacterial Source Tracking (BST): The method used is called ribotyping. Basically you create a library of "knowns", or known bacterial sources, and compare those bacteria to the bacteria in water samples, or "unknowns", to attempt to determine the source of bacteria in the water. This data may be available to TCEQ in August. Even if it is not available for the TMDL model, it will be important in the implementation phase of the project.

C: SAWS and SARA are doing a good job of this type of research as well, but the sewer line locations should be mapped and compared with your results. It may even disprove that the source is wastewater.
A: I would like to have that data. Who can provide it?
C: SARA.
Q: Tuletta and James Park are where recycled water is discharged.
A: We are aware of the recycled water discharges and they are included in the model.
C: I think it's important to show people that we looked at ourselves (i.e. SAWS and SARA) first.
Q: Didn't the graphic show that the bacteria level downstream of James Park was lower?
A: I know the input of recycled water helped in the dissolved oxygen problem, but I don't yet know about the bacteria.

Salado Creek Results: During the storm events, the criteria were exceeded at most stations. During baseflow conditions, few stations exceeded criteria.

Results from Storm Event (June 4, 2003)

	Number of stations	No. of stations with geometric means > 126 CFU/100ml	No. of stations with maximums > 396 CFU/100ml
Main Stem	8	8	8
Tributaries	4	4	4
Point Sources	0	NA	NA

Results from Baseflow Event (August 4-5, 2004)

	Number of stations	No. of stations with geometric means > 126 CFU/100ml	No. of stations with maximums > 396 CFU/100ml
Main Stem	8	2	2
Tributaries	4	2	1
Point Sources	1	0	0

USAR Results: During the storm events, the criteria were exceeded at most stations. During baseflow conditions, few stations exceeded criteria.

Results from Storm Event (July 15-18, 2003)

	Number of stations	No. of stations with geometric means > 126 CFU/100ml	No. of stations with maximums > 396 CFU/100ml
Main Stem	11	11	11
Tributaries	3	3	3
Point Sources	3	0	0

Results from Baseflow Event (August 18-19, 2004)

	Number of stations	No. of stations with geometric means > 126 CFU/100ml	No. of stations with maximums > 396 CFU/100ml
Main Stem	11	5	3
Tributaries	3	1	1
Point Sources	5	1	3

LSAR Results: During baseflow none of the mainstem stations exceeded the criteria. There were many exceedences on both storm events.

Results from Storm Event #1 (July 24-30, 2004)

	Number of stations	No. of stations with geometric means > 126 CFU/100ml	No. of stations with maximums > 396 CFU/100ml
Main Stem	4	4	4
Tributaries	2	2	2
Point Sources	5	1	1

Results from Storm Event #2 (November 17-19, 2004)

	Number of stations	No. of stations with geometric means > 126 CFU/100ml	No. of stations with maximums > 396 CFU/100ml
Main Stem	4	4	4

Tributaries	2	2	2
Point Sources	4	1	1

Results from Baseflow Event (August 3-4, 2004)

	Number of stations	No. of stations with geometric means > 126 CFU/100ml	No. of stations with maximums > 396 CFU/100ml
Main Stem	9	0	0
Tributaries	2	2	0
Point Sources	2	1	1

Q: Which tributaries were sampled?
A: Escondido and Cibolo Creeks.
KN: We will share exceedence data (Karnes and Falls City with the TCEQ Regional Offices) so they can use the information to get ready for their next round of compliance reviews/investigations.
JM: The plants chlorinate, but we still found bacteria.
KN: Yes, the value at Karnes City Main was very high.
Q: Does Karnes still have 2 WWTP?
A: Yes.

Modeling Preliminary Results

Method: The HSPF model was used in this study.

Step 1: Break the watershed into smaller, "sub-watersheds" with distinct characteristics in the model.

Q: How did you create the sub-watersheds?
A: We started at a point of interest (i.e. USGS gauge), then partitioned between tributaries to examine their contributions, and correlated areas with those previously used in a USGS model.
Q: Why is Area #21 so large?
A: It feeds in below the impaired zone of the SAR, so it's of less interest

Step 2: Hydrologic calibration of model involves inputting runoff slopes, soil characteristics, and precipitation data into the model. The model then calculates values for total runoff, total storm volume, etc. which are compared to the actual data.

The simulated and observed values lined up fairly well for most areas. [JM showed several graphs comparing simulated and actual values. These are included in the PowerPoint Presentation.]

Q: What about baseflow? [Did the simulated and observed values match?]
A: They also matched closely.

Q: Did you reserve data to use for validation of the model?
A: Yes, 2003 data was reserved to validate the model.
Q: How many USGS gauges were available to supply data?
A: Only two, one at the International Airport and another further north. There is nothing available for the lower part of the watershed.

Calibration statistics were calculated for each station. For example, the 8.9% model error calculated for total storm volume at the Loop 13 station is within acceptable criteria.

Step 3: Predict daily flow and add bacteria component to the model.

Fecal sources considered in the model: (1) Direct (failing septic tanks, direct wildlife contributions, direct livestock contributions, leaking sewer lines), and (2) Indirect (Runoff from rangeland/forestland, Runoff from Cropland, Runoff from Urban Areas).

Q: Cropland- could manure/fertilizer be a source? Is it used here?
A: There's no Cropland in the Salado Creek watershed. There's a little in the USAR, so it's not really considered. It will likely have to be considered in the LSAR model.

A part of the modeling software is called "Fecal Tool" and it calculates fecal loading rate for animals.

Step 4: Modeling and calibration based on actual data. Historic and recent datasets were combined.

Baseflow bacteria concentrations are generally lower than those observed during storm events. The median values were used in model calibration because they are less vulnerable to single, high data points. Data are analyzed separately for each station, and then simulated and actual data are compared.

For example, for most of the Salado stations the values are close. This is not the case at station 410NE. This may be because the model for this station is based on few historical data and also because there is not usually continuous flow in this area.

C: Also, the creek is ponded just upstream of that station.
A: We looked at that, but did not incorporate it into the model.

Also, the observed samples are a one-time "grab" whereas the model is predicting a mean daily concentration, so that makes comparisons more difficult. However, this is the best way to calibrate and validate the model based on available data.

Mr. Miertschin showed an example of the model output for a single station (Loop 13) on Salado Creek (refer to PowerPoint presentation) showing the predicted mean daily fecal coliform concentrations calculated by the model. Peaks in the graph correspond to rain fall events.

Q: What intensity of rainfall are we talking about?
A: We input data from the 2 available USGS stations. For small storm events there is little or no runoff. For larger storms, there would be runoff. There is a calibration parameter in the model for the size of storm (in inches/hour) needed to produce runoff. For Salado Creek, we calculated that 0.5 inches/hour would wash 90% of the load off of impervious surfaces and that 1.0 inches/hour would wash 90% of the load off of pervious surfaces. These values are consistent with the published data, but published data values vary widely.

Step 5: The next step is to plot sliding, 30-day geometric means of bacteria concentration to analyze the daily data. The plot shown in the PowerPoint presentation shows the sliding 30-day geometric means after allocation. Using this method, you can change allocation rates and rerun the model to determine if the allocation rate you specified would keep the bacteria levels within EPA criteria.

For example, Mr. Miertschin showed one plot of a scenario of 90% reduction in residential and commercial PERLNDS and IMPLNDS for the central reach of Salado Creek. This scenario would not keep bacteria levels within the EPA criteria.

A second allocation example with both the 90% reduction in residential and commercial PERLNDS and IMPLNDS and a 23% reduction in direct sources would keep bacteria levels within EPA criteria.

A third example was calculated with a 30% reduction in direct sources only. This allocation strategy would also keep bacteria levels within EPA criteria.

Mr. Miertschin also briefly discussed the San Antonio River, for which the model is less developed. Data from this river shows a strong influence of the San Antonio Zoo. In most of the allocation strategies modeled to date, fecal coliform levels would still exceed EPA criteria.

Next Phase

First, Mr. Miertschin will complete the modeling of several allocation strategies and present the results to TCEQ. Second, a draft report will be prepared. Finally, TCEQ will prepare a TMDL.

Q: Will the BST library be made public?
A: Yes. It will be a State-owned library that TCEQ will manage.

KN: The State is using data from both ribotyping and PCR methods so that results can be compared.

Q: When will the library be available?

A: Data from the USAR is due to TCEQ in April, but the University has been slow to deliver results. We will definitely have it by August, which is the end of TCEQ's fiscal year.

JM: If we have it by then, it can be directly incorporated into the model.
KN: We hope to have another Stakeholder's Meeting in August to present the results.
JM: The model can still be built without the BST data, if necessary.

Q: You said that you created two "populations" of data- Baseflow and Storm. How did you separate the data into these groups?
A: Data collected during a storm and 3 days before were called Storm data. It was usually obvious. We also looked at the actual rain data. This was a tedious process done station by station.

Mr. Miertschin concluded his presentation and indicated that TCEQ plans to hold another Stakeholder's Meeting in August 2005.

Mr. Niemann then initiated discussion among the stakeholders. He reiterated that stakeholder input is very important and that TCEQ does not intend for anyone to be surprised by the final TMDL; that is why the stakeholder process is in place.

Q: What were the BST results from Peach Creek?
A: Approximately 25% from humans, 25% from cattle, and 16% from chickens. The poultry industry was relieved that this data indicates that they are not the sole source. TCEQ hopes these results will lead to the poultry industry's cooperation in the process.

C: People in the LSAR area are really waiting to see the BST results. I think they have recently begun to consider that they are part of the problem; that it's not just from San Antonio. However, since many LSAR people blame San Antonio, which may explain the low attendance at this Stakeholder Meeting.
A: We don't see a real reason to have a meeting specifically for the LSAR at this time, since the BST data is still unavailable.

KN: I compared the preliminary model data presented today with that from a recent SARA study. SARA concluded that elevated bacteria levels were restricted to the lower reach of the LSAR, but our data identified Falls City and Karnes City to be potential sources. Elevated levels typically occur after storms, in concurrence with Mr. Miertschin's data, but the baseflow data also indicated that Karnes City had a value of 16,709 org/100ml. That's extremely high.

C: The data presented today show that, approximately 4 days after a storm event, bacteria concentrations go back down. One problem is the lack of rainfall gauges in this watershed.

Q: Did you sample at the Kennedy WWTP?
A: Yes.

Q: Kennedy WWTP discharges into Escondido Creek?
A: Yes.

C: A private contractor, U.S. Filter, runs the Karnes City WWTPs. I think the ponds may not be maintained properly.
KN: I checked with TCEQ investigators about a year ago and they told me that the 2 WWTPs in Karnes were in compliance.
C: Karnes has 2 WWTPs: Milano is larger and older and may be closed soon. I've heard they're trying to get Federal dollars to improve the other one.

Q: What is the timeline for the report to TCEQ on percent reductions and load allocations?
A: The draft report is due to TCEQ in August. TCEQ will then write the TMDL.
Q: Will the implementation stage have public input?
A: Yes.

Q: The criteria of 126 colonies/100mL that you mentioned in the beginning of the presentation- could that be changed?
A: All strategies will be considered in the implementation phase and many possibilities will be discussed between stakeholders and the TCEQ. That criterion is set by the EPA, however, and would therefore be very difficult to change.
Q: Doesn't that typically happen in cases with a large amount of input from wild animals?
A: Yes. Another possibility would be that the model is run with 100% reductions and the criteria still cannot be met (i.e. it is determined to be an unreasonable standard).
KN: The use of Contact Recreation is a reality for this river so we do want to get it within the criteria for that use.

C: Our Board of Directors drives SARA and one of them always asks about improving water quality. I think SARA's Board is committed to improving the water quality of the river.

C: I would expect a lot of public interest in the LSAR.
JM: Where? Goliad? We will schedule a future meeting there.

KN: All information from this meeting, including the presentation and minutes, will be on the TMDL website. Therefore, even though people missed today's Stakeholder's Meeting, they can stay informed.

KN: TCEQ is considering asking SARA to spearhead TMDL implementation, especially with regards to their involvement with the Regional Flood Control, Drainage, and Storm Water Management Program and the San Antonio River Improvements Project.
Q: The goal is to achieve Contact Recreation use standards?
A: Yes.

KN: Any recommendations for implementation strategies? We would like to give the EPA a plan to achieve real results.
[NOTE: no specific responses]

Q: How species-specific will the BST results be?
A: To the level of dog, cat, bird (maybe swallow or egret). The lab may look at other libraries to match unknown samples.

Q: Has the Zoological Society been involved in your project-related correspondence?
A: We need to give them an update. Even without the BST data, we know they have a high discharge and the model is reflecting that.
Q: Are zoo animals in the library of "knowns"?
A: Yes.

The meeting adjourned at approximately 1:40 PM. The next meeting will be scheduled for August 2005.